

REMARKS/ARGUMENTS

In the Claims

Claims 1-16 and 18-21 are pending. Claims 1, 9, and 20 have been amended as supported by the original claims and specification, for example, in Fig. 3(a), pg. 14, last full paragraph, and pg. 21, paragraph 3. Claim 21 is new and based on the original wording of claim 1. No new matter is added.

Interview Summary

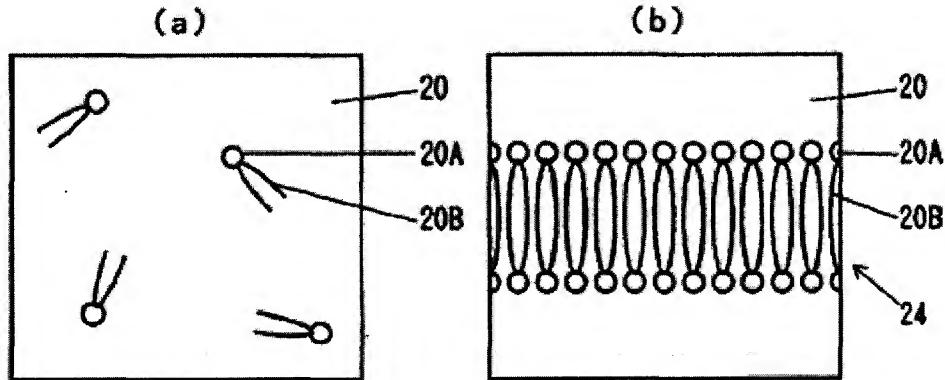
Applicants wish to thank Examiner Ziska for the helpful and courteous discussion with Applicants' representative on March 29, 2011. Support for the language describing the lipid solution and the formation of the lipid bilayer was discussed, and it was noted that the buffer solution of the specification, not the lipid solution, optionally contains microstructures. Structural features of the device were discussed which are different from *Vogel* and relevant to a device wherein a lipid solution as claimed forms the planar lipid bilayer. This discussion is elaborated below.

Request for Reconsideration

The rejection of claims 1-19 under 35 U.S.C. § 103(a) as being obvious over U.S. Appl. Pub. No. 2003/0146091 A1 by *Vogel* et al. (*Vogel*) is traversed.

Amended claim 1 now recites that the lipid solution comprises unarranged phospholipids, each of which having a hydrophilic group and a hydrophobic group, and which form the planar lipid bilayer upon the applying of the second buffer solution in (c). The claim also clarifies that the buffer solution filling the microchannel below the aperture can be the same or different from the buffer solution applied on top of the lipid solution.

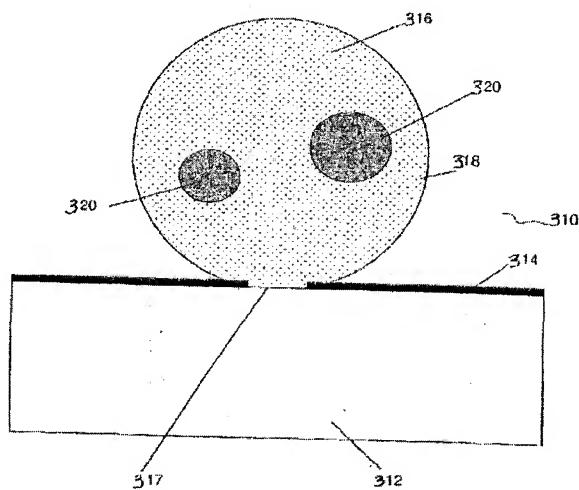
This recitation details that the planar lipid bilayer formed after adding the second buffer solution, is formed from phospholipids which were not “arranged.” This is depicted in Fig. 3 below:



The same is described in the specification at pg. 14, last full paragraph, as follows:

... the lipid solution 20 includes a component (phospholipids) having a hydrophilic group 20A and a hydrophobic group 20B. By thinning the lipid solution layer, as shown in FIG. 3(b), the hydrophobic group 20B is arranged to face inside, and engaged and bound to each other to form the planar lipid-bilayer membrane 24.

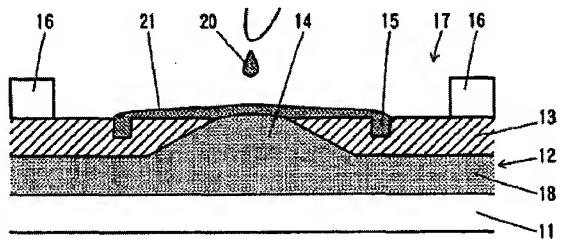
Unlike the claimed process, *Vogel* discloses docking already arranged phospholipid structures onto its aperture. Fig. 19 of *Vogel*, shown below, typifies the method taught therein, whereby 320 is a “membranous object,” e.g. a liposome or a cell, which is docked onto the aperture of a surface 314 (here hydrophobic) of the body 312:



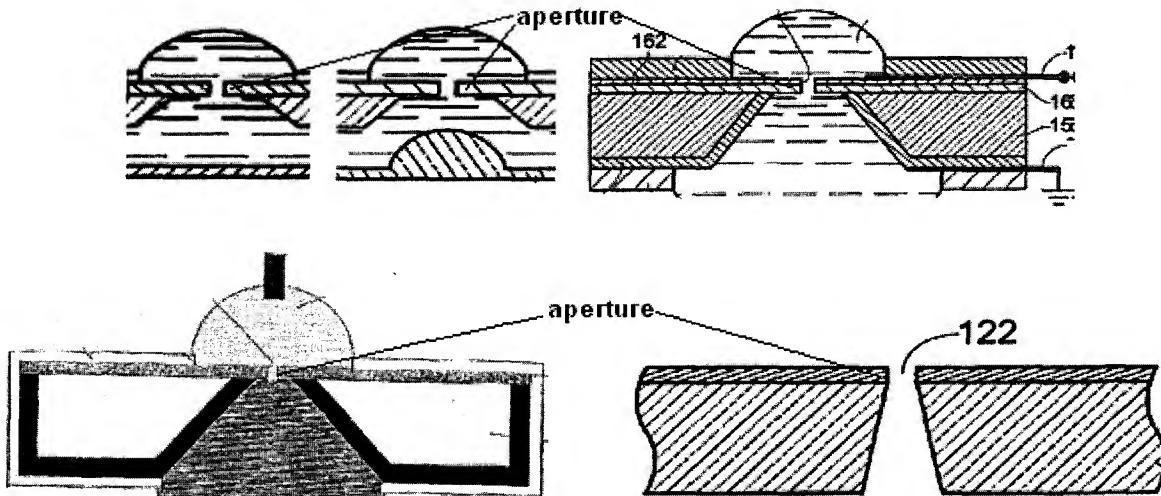
Vogel merely docks an already arranged phospholipid structure onto an aperture. Arranged phospholipid structures disclosed in *Vogel* are as follows: at paragraph [0181], *Vogel* describes that these can be cells, vesicles, or biological organelles; at [0192], unilamellar vesicles; at [0196], cells or vesicles; at [208], [0210], and [0227], vesicles, etc.

Nowhere in *Vogel* is it described or suggested that the planar lipid bilayer should be formed as claimed, namely, from a lipid solution having unarranged phospholipids, upon the addition of a buffer solution on top of it. *Vogel* does not provide the artisan with any motivation or guidance to form a planar lipid bilayer in such a manner, nor would the artisan have any reasonable expectation of success in creating a process as claimed based on *Vogel*. As such, claim 1 and claims depending from it are not obvious over *Vogel*.

Amended claim 9 now recites a device in which the liquid trap is a “trench” formed at the periphery of the aperture that thins a solution added above the aperture, and that the aperture is tapered, such that the diameter of the aperture narrows from the lower side toward the upper side. The liquid traps serve to thin, for example, a lipid solution in which the phospholipids are unarranged. *See* pg. 14, last full paragraph, and Fig. 2(b), labeled 15. This brings about the formation of a planar lipid bilayer on sufficient thinning, e.g. by adding a buffer solution on top. *See* Fig. 2(c). The taper of the aperture serves to allow that the filling of the underlying chamber up to the aperture. *See* pg. 13, last full paragraph and Figs. A device of this type is exemplified by the following image:



In contrast, *Vogel* provides devices without a liquid trap, and without a tapered aperture, but rather optionally having a tapered chambers, as shown below:



Vogel's device does not contain any sort of a liquid trap, as can be seen above. This is because *Vogel* does not contemplate forming a planar lipid bilayer from a solution of unarranged phospholipids. *Vogel*'s device is instead suitable for docking a formed microstructure, as illustrated in each of the examples therein. Furthermore, the tapering of the aperture which is lacking in *Vogel* likely also because *Vogel* contemplates "positioning and/or analyzing membrane bound samples," (see e.g. paragraph [0041]) not a device suitable for forming a planar lipid bilayer upon an aperture above a chamber filled with buffer solution. As *Vogel* neither discloses nor suggests these features, which function to provide a device suitable for the formation of a planar lipid bilayer from a solution of unarranged phospholipids, the artisan would not be motivated to modify *Vogel*'s devices to contain both a lipid trap and a tapered aperture. The utility in doing this is lacking when one contemplates "locating" or docking previously arranged phospholipid microstructures. As such, claim 9 and claims depending from it are not obvious over *Vogel*.

Therefore, the rejection of the claims 1-19 as obvious over *Vogel* is believed to be unsustainable and withdrawal of this rejection is respectfully requested.

The rejection of the claims under 35 U.S.C. § 102(a) as being anticipated by Suzuki, H.; Kato-Yamada, Y.; Noji, H.; Takeuchi, S. "Planar Lipid Membrane Array for Membrane Protein Chip," *Maastricht MEMS 2004 Technical Digest: 17th IEEE Int'l Conf. of Micro-Electro Mechanical Systems*. January 25-29, 2004, pg. 272-275, is antedated by submission of the certified English translation of the priority document, JP 2004-012995, attached to this filing. JP 2004-012995 was filed January 21, 2004, and it supports the claims in their present form. Withdrawal of this rejection is requested.

The rejection of claim 20 is believed to have been obviated by the amendment made to the claim, whereby "arranged phospholipids" is recited rather than "microstructure." As discussed personally, this language finds literal support in the specification, for example, at pg. 14, last full paragraph, as well as in Fig. 3(a). Withdrawal of this rejection is respectfully requested.

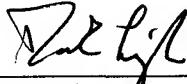
The present application is now in condition for allowance and early notice of such action is earnestly solicited.

Respectfully submitted,

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